AMENDMENTS TO THE SPECIFICATION

Please insert the following three new paragraphs in the Background section before paragraph **[0004]** on page 2:

Chromatographic separations encompass a variety of separation methods adaptable for different classes of compounds. Chromatography relies on differential partitioning between a flowing mobile phase and a stationary phase to separate the components in a mixture: sample components that partition strongly into the stationary phase are retarded more and thus are separated from components that stay predominantly in the mobile phase and exit the separation device earlier.

Examples of chromatography techniques include: gas chromatography (GC) that is used for separation of small volatile organic compounds (including chemical warfare agents); high pressure liquid chromatography (HPLC) that is a common method for separation of organic compounds in liquid phase; reverse phase HPLC that is particularly relevant for protein separation; and size exclusion chromatography (SEC) that separates biomolecules based on their size and shape. In GC separation of different molecules occurs due to the varying degree of adsorption of the molecules in the gas phase on the solid stationary phase. RP HPLC relies on using two component mobile phase and hydrophobic surfaces. One of the components of the mobile phase is water, which does not interact with the hydrophobic adsorbent surface and therefore does not compete with the analyte for the adsorption sites. The other component of the mobile phase is usually an organic solvent, is "the modifier" which can interact with the

adsorbent surface and compete with analyte molecules for the adsorption sites. Increasing the concentration of the "modifier" mobile phase leads to the decreasing of the analytes retention. Therefore, passing a gradient of modifier concentration through the column will lead to a gradual removal and separation of the analyte based on the retention strength. And SEC relies on pathway-dependent velocity distribution in a column packed with porous packing material. Flow through the pores is much slower than the flow around the particles. Smaller molecules can enter the pores; therefore their average migration speed is small. The bigger molecules experience steric hindrance in permeation inside the packing pore space and move through the column primarily around the particles with fastest possible speed. As a result the biggest molecules come out of the column first, and the smallest ones come out last.

While all of these known techniques are based on different physical mechanisms, they share several common characteristics, including (1) requiring a porous medium; (2) being highly influenced by the pore size distribution and surface chemistry of the separation medium; and requiring high surface-to-volume ratio for efficient separation. Prior art examples of currently used separation media include packed beds of porous beads, columns packed with gels of various porosity, columns packed with porous high surface energy materials (such as activated silica).

Please replace paragraph **[0007]** on page 4 with the following:

[0007] <u>There is therefore a need for an active medium for separation, concentration, or filtration having a high surface-to-volume ratio, surface properties suitable for surface</u>

functionalization, robust mechanical strength and elastic properties, chemically inert properties for use with a variety of compounds, and easily patternable to facilitate use in devices requiring miniaturization and integration. And in particular, ~~It~~ it would be advantageous ~~therefore~~ to provide a simple microfluidic sieve device which avoids the need to pack beads, and which also utilizes nanofeatures, i.e. carbon nanotubes, grown into an intertwined mesh to serve as an active medium for separating, concentrating, and/or filtering molecules.